

Vol. 6

No. 11

BULLETIN
OF THE
CHICAGO ACADEMY OF SCIENCES

AMPHIBIANS AND REPTILES
OF
JACKSON COUNTY, MISSOURI

By

PAUL ANDERSON



CHICAGO
Published by the Academy
1942

The Bulletin of the Chicago Academy of Sciences was initiated in 1883 and volumes 1 to 4 were published prior to June, 1913. During the following twenty-year period it was not issued. Volumes 1, 2, and 4 contain technical or semi-technical papers on various subjects in the natural sciences. Volume 3 contains museum reports, descriptions of museum exhibits, and announcements.

Publication of the *Bulletin* was resumed in 1934 with volume 5 in the present format. It is now regarded as an outlet for short to moderate-sized original papers on natural history, in its broad sense, by members of the museum staff, members of the Academy, and for papers by other authors which are based in considerable part upon the collections of the Academy. It is edited by the Director of the Museum with the assistance of a committee from the Board of Scientific Governors. The separate numbers are issued at irregular intervals and distributed to libraries and scientific organizations, and to specialists with whom the Academy maintains exchanges. A reserve is set aside for future need as exchanges and the remainder of the edition offered for sale at a nominal price. When a sufficient number of pages have been printed to form a volume of convenient size, a title page, table of contents, and index are supplied to libraries and institutions which receive the entire series.

Howard K. Gloyd, Director of the Museum

Committee on Publications:

Alfred Emerson, Professor of Zoology, University of Chicago.
John Rice Ball, Professor of Geology, Northwestern University.
Hanford Tiffany, Professor of Botany, Northwestern University.

BULLETIN

OF THE

CHICAGO ACADEMY OF SCIENCES

**AMPHIBIANS AND REPTILES
OF JACKSON COUNTY, MISSOURI**

By

PAUL ANDERSON

Since the appearance of Julius Hurter's *Herpetology of Missouri* (1911) very few papers dealing with the amphibians and reptiles of the state have been published. Blanchard (1925) reported on a collection from southeastern Missouri and southern Illinois, Boyer and Heinze (1934) published an annotated list of species from Jefferson County, at the east-central border of the state, and miscellaneous records have been included in a few other papers not primarily concerned with the fauna of Missouri.

The present paper, dealing with a county in western Missouri, is based upon the writer's observations and collections over a period of twelve years, although most of the data here recorded have been assembled between 1935 and 1941. The list of amphibians and reptiles for Jackson County now includes four salamanders, eight frogs and toads, five lizards, twenty-three snakes, and nine turtles, a total of forty-nine species and subspecies, including a narrow-mouthed toad (*Gastrophryne olivacea*) and a skink (*Eumeces obsoletus*) reported for the first time for the state. Also, evidence is presented which indicates an extension of the known range of a turtle (*Kinosternon subrubrum hippocrepis*).

Excluding species listed as occurring throughout the state, Hurter (*op. cit.*) recorded for Jackson County two salamanders, three frogs and toads, four lizards, ten snakes, and two turtles, a total of twenty-one species and subspecies.

Jackson County is located on the western edge of the state about midway between the north and south borders and has an area of 625 square miles. The Missouri River forms the northern boundary and furnishes many hundred acres of sandy bottom land. The big Blue River, which rises in Kansas, runs from the southwest corner of the county in a northeasterly direction through Swope Park, skirting the eastern boundary of Kansas City, and empties into the Missouri River. The Little Blue River rises in two forks in the south central part of the county. It passes Independence on the east, flows into the Missouri River five miles northeast of Atherton. Along these streams and the many creek valleys are wooded tracts with outcropping ledges of limestone. The principal trees are elm, oak, and walnut.

A strip of Wabash silt loam borders the Missouri River and the valley of the West Fork of the Little Blue River. Most of the southern half of the county is Summit silt loam. The central northern part of the county is Knox and Marshall silt loam.

The altitude ranges from about 1100 feet near Lee's Summit to 675 feet near Levasy. Lake Lotawana is the county's largest body of water and covers several hundred acres.

Thanks are due the following for assistance in collecting or for specimens: Norman Williams, Glenn Meador, Rex Conyers, Phillip Jenkins, Jack Joy, P. D. Evans, August Napper and Chalmer Stowell. I am indebted to Dr. H. K. Gloyd for many helpful suggestions and to my wife for recording data and assistance in preparing the manuscript. Specimens of each of the species and subspecies have been presented to the museum of the Chicago Academy of Sciences.

***Necturus maculosus* (Rafinesque).** Mud Puppy.

A single specimen was caught on a trot line in the Missouri River near Atherton on March 28, 1937.

***Ambystoma maculatum* (Shaw).** Spotted Salamander.

A spotted salamander was found crossing U. S. Highway 24 near Levasy on a rainy evening late in March, 1938.

***Ambystoma tigrinum tigrinum* (Green).** Tiger Salamander.

A salamander of this species was found about a foot underground, May 20, 1939, three miles east of Buckner. One was plowed up by a farmer April 17, 1939, three and one-half miles northeast of Independence; a third was found in a well eight miles northwest of Independence, May 3, 1940. One was collected near Raytown in the fall of 1941, and another was discovered in a water meter pit, eight miles northeast of Independence, December 6, 1941.

These specimens have the circular spots of this form but one from St. Joseph, Buchanan County, Missouri, about 50 miles northwest, exhibits the barred pattern of the western subspecies, *A. t. mavortium* (Baird).

***Ambystoma texanum* (Matthes).** Narrow-mouthed Salamander.

One of these salamanders was found about eighteen inches underground five miles east of Independence, April 8, 1937. Two others were collected under leaves on the bank of the Little Blue River near Ripley in May 1939, and another at Knobtown, April 9, 1940.

***Bufo americanus americanus* (Holbrook).** American Toad.

American toads are common throughout the county. Three males were singing on March 29, 1938, in Slover Park Lake in Independence. This is the earliest date recorded in Jackson County for this species. One male was found at this locality on April 1, 1939. On April 11, 1939, twenty-eight were collected in a small pond, two miles northwest of Independence; only three were females. The earliest date on which this species was heard in 1940 was March 31, when a few scattered individuals were heard in the Lake of the Woods in Swope Park, Kansas City, and in a pond at Independence. However, a large chorus was singing in a small pond two miles southwest of Independence on this same date. Numerous recently transformed toads were observed on July 2, 1938, around Adair Park Lake near Independence.

In the eastern states *Bufo americanus americanus* reaches a larger size than *Bufo woodhousi fowleri*, but in the western part of its range the reverse is true. However, one *americanus* collected in the writer's yard at Independence was far above the average size for this species. It measured 143 mm., a size unequaled by any of the Fowler's toads.

***Bufo woodhousi fowleri* (Hinkley).** Fowler's Toad.

Fowler's toads have been found throughout the county but are most numerous in the sandy Missouri River bottoms. The earliest date on which this species was heard singing was March 31, 1940, when one was heard in a pond one and one-half miles southwest of Independence. Seven males were observed in Slover Park Lake at Independence at about 10:00 P. M. on March 29, 1938, but none were singing. Seventy-five were collected the evening of April 27, 1937, on the Atherton road just south of Atherton and from water-filled ditches adjacent to the road.

Numerous toads of this species were seen at night in June, 1937, along a stream near Courtney and in the adjacent sandy fields.

In captivity male Fowler's toads would clasp female American toads and vice versa. In only a few instances was the clasping position retained until eggs were laid and none of these were hatched. However, some specimens collected appeared to be hybrids.

***Acris gryllus crepitans* Baird.** Cricket Frog.

The cricket frog is common around pasture ponds and lakes in Jackson County. It has been heard singing from April 1 to July 6.

***Pseudacris nigrita triseriata* (Wied).** Three-striped Swamp Frog.

This is one of the most ubiquitous frog inhabitants of the county and is the first to appear in the spring. The species has been heard singing as early as February 28, but usually not until about March 20.

This frog prefers a swampy habitat or shallow pools with much vegetation but may be found in temporary rain pools, water-filled ditches and even in lily pools in town.

On March 22, 1938, forty clusters containing from thirty to seventy eggs each were observed in a temporary pool at Sugar Creek; most contained larvae. On the following day a clasping pair was caught at this pool at 11:00 A. M. The female started depositing eggs at 1:00 P. M. and laid 283. This large number of eggs, in comparison with the clusters found in the field, suggests that a single female may lay eggs in several clusters.

***Hyla versicolor versicolor* (Le Conte).** Tree Frog.

This frog is not common locally. One was collected three and one-half miles southwest of Blue Springs in the fall of 1937. Several were heard singing in trees at Dickinson's Lakes on the night of July 21, 1938, and one was collected. Others have been heard singing in temporary pools at the Standard Oil Refinery at Sugar Creek. One was collected on May 26, 1939, at Sugar Creek.

***Rana catesbeiana* Shaw.** Bull Frog.

The bull frog is found around all of the larger ponds and lakes. Subadults appear about the first week in April but the adult males are usually not heard until May.

***Rana pipiens* Schreber. Leopard Frog.**

The leopard frog is very common and has been observed moving slowly under ice in January. On February 20, 1938, five were observed in decaying vegetation near the bank of the Little Blue River near Atherton. A clasping pair was found as early as March 12 but breeding continues through April.

***Gastrophryne olivacea* (Hallowell).**

Western Narrow-mouthed Toad.

On April 18, 1937, the writer collected a western narrow-mouthed toad one and one-half miles northeast of Atherton. Other specimens were collected at this locality on the following dates: April 20, 1939; September 8, 12, and 16, 1941. Another was found seven miles east of Independence, May 12, 1939. All of these were found in moist earth under rocks on hillsides (the usual habitat for this species in Kansas) but specimens were found at Sugar Creek on grass covered hillsides at night as follows: September 2 and 10, and October 10, 1941.

Two others were collected near Parkville, Platte County, Missouri, March 31, 1938. Another collected at Freeman, Cass County, Missouri, June 14, 1941, contained eggs.

Those collected near Atherton and Sugar Creek were brownish gray, or greenish gray dorsally with indefinitely outlined black spots on the back in the middorsal region and on the hind legs. The ventral surface is immaculate white. One (PA 1573) is light gray and the spots on the back form three irregular stripes.

G. carolinensis has been reported from eastern Missouri but the specimens listed above appear to be the first records for the western species in Missouri.

G. olivacea differs from *carolinensis* in structure and color, and in the fact that the former has a smooth skin while the southeastern species has minute tubercles.

***Crotaphytus collaris collaris* (Say). Collared Lizard.**

Collared lizards seem to be absent over most of the county but were quite common in areas about seven miles southeast of Independence and three miles southwest of Blue Springs. Many were found around limestone ledges at these localities each spring and fall. Early in the morning and in late afternoon they were under flat rocks and were comparatively easy to capture but when out in the sun during the day capture was difficult. Seven juvenile specimens collected at one place, October 4, 1936, were all females; two juvenile males were found on

another section of the ledge several hundred yards distant. This apparent segregation of sexes probably has no significance but might possibly point to some difference in habits.

A captive female laid seven eggs on June 22, 1936, and one more on the following day.

While the interorbital scutellation was variable, none were found to have two complete rows of interorbitals; instead all specimens had from one to four single scales connecting the orbital areas.

***Ophisaurus ventralis* (Linné).** Glass Lizard.

Glass lizards were found infrequently. Specimens were collected at Blue Mills, May 24, 1939, seven miles east of Independence, April, 1940, and four miles east of Independence, May 1, 1941. Captive specimens fed on meal worms, grasshoppers, crickets and occasionally on ground beef.

***Cnemidophorus sexlineatus* (Linné).** Six-lined Race Runner.

Hurter (1911) records this lizard from Jackson County, but in reply to a request for information Dr. Leonhard Stejneger stated there are none in the Hurter collection at the U. S. National Museum bearing such data, and I have been unable to find this species in the county. However, specimens were collected in the railroad yards in the industrial section south of Kansas City, Kansas, about a mile from the Jackson County line. Race runners have also been collected in adjoining Johnson County, Missouri, near Warrensburg.

***Eumeces fasciatus* (Linné).** Five-lined Skink.

This is the most abundant lizard in the area. A female collected May 26, 1936, laid four eggs in the evening of June 14, and two more during the following day. Females were found coiled around their eggs through June. The sets of eggs varied from five to ten in number, average seven.

***Eumeces obsoletus* (Baird and Girard).** Sonoran Skink.

A search was made in suitable habitats for Sonoran skinks in western Missouri and this species was found in two localities. One was collected along outcropping limestone rocks near a small pastureland stream, five miles south of Kansas City, Jackson County, Missouri, May 2, 1940 (a second specimen at this locality September 8, 1941), and two others near Freeman, Cass County, Missouri on May 27 and June 14, 1941.

The finding of *Eumeces obsoletus* in Missouri is not surprising in view of its occurrence in adjoining counties in Kansas, but the above records apparently constitute the first for this species in the state.

I have collected this species in three localities in Johnson County, Kansas: DeSoto, six miles southwest of Stanley, and four miles southeast of Stanley. The last locality is only one-half mile from the Missouri-Kansas state line. In Linn County, Kansas, I have collected this species three miles southwest of La Cygne and five miles southeast of La Cygne. The latter locality is approximately five miles from the Missouri-Kansas state line.

Taylor (1936) lists this species from the following Kansas counties bordering the Missouri state line: Leavenworth, Johnson, Miami and Bourbon.

***Carphophis amoena vermis* (Kennicott). Worm Snake.**

Many of these snakes were found each spring on wooded hillsides under rocks in moist earth. Ring-neck snakes (*Diadophis punctatus arnyi*) were usually found in the same localities.

A worm snake collected on May 23, 1936, laid three eggs on June 26. The eggs were thin-shelled and pliant and measured 40 x 9 mm. Another laid a single egg June 25, 1938, which when accidentally ruptured, August 20, contained a well developed embryo.

Numerous specimens have been taken in various localities near Independence, at Lee's Summit, Little Blue, Knobtown, Sugar Creek, Oak Grove, and one mile southeast of Raytown.

The largest measured 375 mm. in total length, far in excess of the length of any others.

***Diadophis punctatus arnyi* (Kennicott). Ring-neck Snake.**

This snake is very common in suitable localities over the county. Sixty specimens were observed in one afternoon's collection. Seven were found together under one rock. Localities are: Little Blue, Knobtown, Leeds, Blue Springs, Sugar Creek, Lee's Summit, Swope Park, and Bo-Ho-Ca Camp, south of Kansas City.

Situations frequented by ring-necks were usually limestone ledges on hillsides. These snakes were never observed in the open but were always concealed under rocks, logs or in decaying leaves. They were most easily found in April and May and were seldom encountered in July and August. The earliest date of capture was March 26, the last was November 22.

The usual ventral pattern was an arrangement of the belly spots in twos. However, the spots were irregular in some and occasional specimens had a single median row.

***Heterodon contortrix* (Linné).** Hog-nosed Snake.

This snake is found infrequently in Jackson County. A juvenile was collected in August, 1931, near Horseshoe Lake, southeast of Independence; a second specimen was found four miles southeast of Independence on September 28, 1926 and another April 29, 1939. The Independence High School has a specimen caught in 1932 near Courtney. One was killed in the Standard Oil Refinery at Sugar Creek on August 10, 1939, and a small specimen was found near Sibley on June 16, 1940.

Captives fed very readily on toads and would take a mouse occasionally. One ate a fence lizard (*Sceloporus undulatus undulatus*).

One Jackson County specimen shows pronounced melanism, the others are grayish yellow with black blotches. Most of the hog-nosed snakes taken fifty miles southeast in the vicinity of Warrensburg, Johnson County, Missouri, exhibited beautiful red hues.

***Opheodrys vernalis blanchardi* Grobman.** Smooth Green Snake.

One was found near Doult's Lake, south of Independence, about 1930, and another near Atherton in August, 1933. The latter had 139 ventrals, 81 caudals, 15 dorsal scale rows and 7 labials. It measured 430 mm. in total length and 128 mm., tail length. The Independence High School has had specimens brought in by students at various times, but none have been received in the past four years.

***Opheodrys aestivus* (Linné).** Rough Green Snake.

This snake is moderately common and has been found near Atherton, Oak Grove, at Dickinson's Lakes near Independence, and nine miles southeast of Independence.

One was found September 13, 1936, under a stump that had been pulled from the ground. Seven red-barred garter snakes (*Thamnophis sirtalis parietalis*) were also under the stump.

***Coluber constrictor flaviventris* (Say).** Blue Racer.

Blue racers are quite common on rocky hillsides, in open pastures, and around ponds and cultivated fields.

Excreta of freshly caught specimens nearly always contains fragments of crickets and grasshoppers. One when taken from a collecting sack, had eaten a worm snake (*Carphophis amoena vermis*) and was then eating a ring-neck snake (*Diadophis punctatus arnyi*). Some captive blue racers fed readily on grasshoppers, house mice, and small frogs; others refused all food offered.

Two were observed in coitus on April 18, 1936.

One, collected June 1, 1938, contained seven well developed eggs when preserved June 30, 1938.

Two specimens caught October 19, 1936, seven miles east of Independence, were black dorsally and pale blue-gray on the ventral surface. Numerous others taken at various times in this vicinity exhibited the normal color of this subspecies. One has 19 dorsal scale rows instead of the usual 17.

***Elaphe obsoleta obsoleta* (Say). Pilot Black Snake.**

These snakes are quite common locally and have been found in nearly all localities where there is a suitable habitat. They were usually among rocks on hillsides but were occasionally seen climbing in trees. Some were found in the vicinity of water and captives showed a decided liking for lying in the water pan.

Most specimens in captivity fed voraciously on mice, small rats, and sparrows, but some refused all food offered. Some were very mild-natured, others remained vicious and would strike whenever the cage was opened.

Nearly all large individuals showed scars, usually on the anterior third of the body, which are probably the result of injuries sustained when the snake was capturing rodents.

***Pituophis sayi sayi* (Schlegel). Bull Snake.**

The bull snake is apparently quite rare in Jackson County, although I have found a number of them just a few miles across the border in Johnson County, Kansas. A snake unmistakably this species was seen four miles southeast of Independence but it escaped into a crevice in a ledge before it could be caught. A dead bull snake was found on the Missouri-Kansas State Line Road south of Dallas, Missouri, in July, 1938.

***Lampropeltis getulus holbrooki* (Stejneger). Speckled King Snake.**

This king snake appears to be rare, as only three specimens have been found. The first was found at Dallas on March 28, 1938; the other two were taken one mile northeast of Little Blue and nine miles southeast of Independence on April 15 and May 2, 1939, respectively.

They fed readily on ring-neck snakes (*Diadophis punctatus arnyi*), worm snakes (*Carphophis amoena vermis*), and skinks (*Eumeces fasciatus*).

***Lampropeltis calligaster* (Harlan).** Prairie King Snake.

Prairie king snakes are moderately common in some localities in Jackson County. About ten years ago they were very common in some open pasture land about two and one-half miles east of Independence. Snakes of this species recently killed by cars could nearly always be seen on a road adjacent to the pasture. Increased traffic has evidently taken its toll, for they are seen infrequently now.

Specimens have been taken two miles north and two to seven miles east of Independence.

A cluster of thirteen eggs of this species was plowed from a field in the Little Blue River bottom land about one mile west of Lake City on August 6, 1939. The eggs were so badly desiccated when received that the embryos were dead, but probably would have hatched within a week, had they remained in the ground. One collected June 2, 1940, laid six eggs on July 13. The eggs averaged 50 mm. in length and 20 mm. in diameter.

***Lampropeltis triangulum sypila* (Cope).** Red King Snake.

One 210 mm. in length was found November 11, 1936, seven miles southeast of Independence. Two have been taken three miles southwest of Blue Springs, two others near Little Blue, and one at Sugar Creek. All but one were caught in April and May.

Two were found in moist earth under deeply imbedded rocks at the copperhead den near Atherton. This den is described under that species.

In captivity they fed on mice and small snakes of various species.

***Natrix erythrogaster transversa* (Hallowell).**

Yellow-bellied Water Snake.

This snake is quite common in the southwestern Missouri prairie region and it has also been found in northwestern Missouri, but there are now very few suitable habitats for it in Jackson County and a persistent search by the writer has brought no specimens to light.

On Missouri localities for this species Hurter (1911, p. 158) writes: "P. R. Hoy in his Journal of an Exploration of Western Missouri in 1854 mentions the capture of *Nerodia transversa* near Lexington, Lafayette County, Missouri, on May 12. Last year Mr. B. F. Bush of Courtney, Jackson County, Missouri, sent me a specimen caught in the neighborhood." The locality given by Hoy, however, is not Lexington. Hoy, recording his explorations in the form of a diary

(1865, p. 434), states: "May 12. Fished with minnow net in the Grand River below the Mill. . . . Shot a *Nerodia transversa*, a rare species of water snake, heretofore found only in Arkansas." This locality by implication was near Utica, Livingston County, as he was collecting at Utica on May 11, 1854.

There is a *transversa* from Jackson County (number 2761 of the Hurter collection) in the United States National Museum but whether from Courtney there is no record. Two others said to be from Jackson County (Hurter 2762 and 2759, USNM 56658-9) are, according to a letter from Dr. Stejneger, apparently *transversa*.

There is some question as to the accuracy of the Jackson County data on these specimens as Mr. Bush told me a short time before his death in 1937 that he had no recollection of finding these water snakes locally and that, in some instances, reptiles he had sent to Hurter from other localities were cataloged with Jackson County data.

***Natrix grahamii* (Baird and Girard). Graham's Water Snake.**

This species has been found in the following localities: Missouri River at Sugar Creek, Lake of the Woods in Swope Park, Allen's Lake, Little Blue, Dickinson's Lakes near Independence, and Bannister Lake.

A captive pair was observed in coitus on May 10, 1938. One caught April 27, 1939, in Brush Creek in Kansas City, Missouri, near the Missouri-Kansas state line, died after giving birth to four young on September 3, 1939. The snake was opened and found to contain nine more. These young average 183 mm. in total length.

Another caught June 16, 1938, at Dickinson's Lakes died September 5, 1938, and was found to contain twenty-five fully developed young. The muscular contractions normally preceding the birth of snakes were observed for a period of three days prior to its death.

***Natrix sipedon sipedon* (Linné). Banded Water Snake.**

This is the most common water snake in the county; it apparently frequents all of the streams and lakes.

One taken at Shady Lake, south of Raytown, on August 15, 1938, gave birth to eighteen young on October 10; another caught August 15, 1941 gave birth to sixteen on August 29, 1941.

***Storeria dekayi* (Holbrook). DeKay's Snake.**

These snakes are not common locally. Three were found under rocks and leaves in a dry creek bed in Swope Park, Kansas City, September 6, 1935; one, a few inches under ground on a grass-covered hillside at Sugar Creek, March 26, 1939; two, on this hillside, eighteen

inches underground, April 7, 1941; and one, at a depth of about two feet, three miles east of Independence, March 27, 1940. Captives ate earthworms readily.

***Haldea valerae elegans* (Kennicott).** Ground Snake.

Four specimens have been collected: two, seven miles east of Independence, April 18, 1936, and April 8, 1939; one, three miles southwest of Blue Springs, October 24, 1937; and one, six miles southwest of Blue Springs, April 3, 1938.

***Thamnophis sauritus proximus* (Say).** Western Ribbon Snake.

Ribbon snakes have been found only in the Little Blue River bottoms near Lake City and at Courtney. They were voracious feeders, and would swallow frogs and fish of very large size, considering their slender bodies.

***Thamnophis sirtalis parietalis* (Say).** Red-barred Garter Snake.

This snake is moderately common and was found in most of the localities in which collecting was done. It is still found within the limits of Kansas City and Independence.

One found in the northern outskirts of Independence disgorged another snake of the same species. The dorsal stripe of the one disgorged was a pale blue-green, but the lateral stripes were the usual greenish yellow. A farmer three miles northwest of Grain Valley uncovered a live garter snake barely two inches under ground on February 22, 1936. The temperature had been near zero a short time previously. Seven were found September 13, 1936, about 26 inches under ground when a large decaying stump was removed.

A female caught near Independence gave birth to forty-two young on July 28, 1937.

In captivity these snakes feed readily on earthworms, fish and mice.

***Tropidoclonion lineatum* (Hallowell).** Line Snake.

These little snakes have been found at various localities in the south residential district of Kansas City and are often encountered when raking leaves from around shrubbery or when removing sod from the edges of walks. Over most of the country they seem to be absent. The only specimen found outside of the limits of Kansas City was caught August 18, 1938, at Lake Lotawana.

***Tantilla gracilis* (Baird and Girard).** *Tantilla*.

A single juvenile was found under a rock near the crest of a hill in Swope Park, Kansas City. Several subsequent trips to this exact locality have not yielded additional specimens. This record apparently constitutes the northernmost record in the state. The species is quite common in the Ozark region of Missouri.

***Agkistrodon mokasen cupreus* (Rafinesque).**

Northern Copperhead.

Copperheads are rather common in a number of Jackson County localities. They are still found in Swope Park and have been taken in the following additional localities: near Grandview, Atherton, seven miles southeast of Independence, seven miles east of Independence, Little Blue, and three miles southwest of Blue Springs.

There appear to be few limited and specific areas used for dens in this part of Missouri. Instead, places used for hibernating seem to be scattered along ledges for a considerable distance. An apparently localized den frequented mostly by copperheads was found about one and one-half miles northeast of Atherton. It is on a knob of a limestone ledge on the east side of the Little Blue River. On April 6, 1937, I found six copperheads on this knob all in an area fifty feet square within five minutes time. A large male was found dead, apparently killed on the previous day. Fourteen others were collected at later dates in April, 1937. None were found elsewhere along the ledge. Several other trips were made to this den later in the spring but no more were found until September 14, 1937, when one female was taken. This snake gave birth to five young on the following day. On September 19, 1937, an adult female and five young, apparently just born, were found within a few feet of each other at this den. Another young was found on September 21, 1937.

The statement is frequently made in literature that the mother snake leaves the young at birth, but considerable evidence has been assembled that indicates that females of *Agkistrodon mokasen cupreus* and *Crotalus horridus horridus* often remain with the young for several days.

In September numerous female copperheads were found under the same rock with their young in Missouri and eastern Kansas. In two instances ecdysis of the young had taken place when found. This was indicated by the shed skins under the rock and the characteristic lighter color and conspicuous yellow on the tip of the tail. Before shedding the color is quite dark and glossy and the yellow on the tail is clouded. Gloyd (1934) found that the first ecdysis of the young took place when they were three to ten days old, and that the majority shed on the sev-

enth or eighth day. My observations on captive born litters have been essentially the same. In two instances litters of young, caught in the field with an adult female, shed on the first day after capture, and once on the second day. On the afternoon of September 7, 1941, a copperhead was observed with three young in a crevice under an overhanging rock at the Atherton den. They were not molested and were still found together the next afternoon. Another female and three young were found together at the den on September 12, and two male copperheads were found at the base of the hill. On September 16 another female was found and two young were about two feet away. One other female and five young were all scattered indicating that they had begun to separate.

On March 26, 1936, a small copperhead was found under a rock with a small black snake (*Elaphe obsoleta obsoleta*) and a blue racer (*Coluber constrictor flaviventris*). Another was taken two miles northwest of Grandview, in May, 1938, and one was caught in Swope Park, Kansas City, September 12, 1938.

In captivity most of the copperheads fed on house mice, small white rats, and took baby sparrows very readily. Often, when feeding on sparrows, they would retain their hold after striking and start swallowing without releasing the prey. A baby copperhead was observed in the field feeding on a narrow-mouthed toad (*Gastrophryne olivacea*), and another ate two adult skinks (*Eumeces fasciatus*) while in captivity.

***Sistrurus catenatus catenatus* (Rafinesque).** Massasauga.

The writer has been unable to find this rattlesnake in Jackson County but there is a specimen in the Dyche Museum, Kansas University (KU 2317), with the following data: Swope Park, Kansas City, October 1, 1915, collected by a park keeper.

***Crotalus horridus horridus* (Linné).** Timber Rattlesnake.

Timber rattlesnakes are found in moderate numbers on limestone ledges which are less frequented by people. Some were found each April and May along the southeastern exposure of a half-mile stretch of timbered rocky ledge, starting about three miles southwest of Blue Springs. A few were also found here in October.

Specimens were also taken seven to eight miles southwest of Independence and on a ledge on the east bank of the Little Blue, about seven miles east of Independence. This ledge has a western exposure and is densely covered with brush. One was caught here April 29, 1938, and two others the following day. Three were caught May 1, 1939, and another, May 11, 1939. One was found two miles south of Lake City, August 5, 1939. Two were killed by a farmer in a chicken yard at Blue Mills in July, 1937. A female containing eight well-developed

embryos was killed on a ledge by William Allbright and from one to three have been killed each year in the Refinery (Sugar Creek). Two of the latter were examined. Since data on the scutellation of these two would not otherwise be available, I am recording the following:

(1) September 13, 1941, female; total length 576 mm., tail length 42 mm.; ventrals 175, caudals 18, dorsal scale rows 23, labials 15.

(2) September 14, 1941, male; total length 875 mm., tail length 70 mm.; ventrals 167, caudals 26, dorsal scale rows 25, supralabials 14, infralabials 15.

On September 8, 1941, a female with four young were seen at the den described under the preceding species. One of the young escaped in a crack before it could be caught. The little snakes shed two days later. Five young were found together under the same rock September 16, but no adult female was near. These shed the day after capture. Captive born litters have not shed until seven to ten days old. This would indicate that those caught in the field had probably remained together for several days at least. A subadult was also caught on September 16 and an adult female, perhaps the mother of the five young, was found at the den on September 20.

Sternotherus odoratus (Latreille). Musk Turtle.

This turtle is not common locally except at Lake City. An occasional specimen is found in Fry's Lake at Little Blue.

Kinosternon subrubrum hippocrepis (Gray). Southern Mud Turtle.

On August 30, 1936, Frank Norris, who for a time operated a frog farm at Lake City, pointed out shells of numerous *Sternotherus* that he had shot around the frog pens. Among these was a plastron of a *Kinosternon*. The piece of shell was sent to Dr. Leonhard Stejneger who very kindly compared it with specimens of *K. flavescens* and *K. subrubrum hippocrepis* and informed me that without question it belonged to the latter, that it matched a specimen of the same size in the U. S. National Museum (101342) from Louisiana, and that the plastron of *flavescens* is much broader and differently shaped. Plans for seining the open water in the marshy areas at this locality for additional specimens did not materialize. The site has now been drained and a large munitions factory established there. However, during the grading work a construction worker uncovered three young of the year (PA 2571-3), on September 20, 1941. They were about ten inches underground on the bank of a drainage canal and within a few inches of each other.

This turtle in Missouri has heretofore been reported only from the southeastern lowlands.

***Chelydra serpentina* (Linné).** Snapping Turtle.

The snapping turtle is met with more frequently in this locality than all the other species combined. It is found in all of the lakes and streams of the county. When the Blue Springs Lake was seined in 1933, eighty snapping turtles were removed. The lake was seined again in the summer of 1935 but no turtles were obtained. Residents north of the lake reported that the turtles had been migrating northward prior to the seining and from two to a half dozen could be seen daily on and alongside the road, traveling northward. Unfortunately the date was not recorded. The weather had been dry and the level of the lake was lower than normal, but it is doubtful if this occasioned the migration. There are no larger bodies of water nearby directly north of this. The Little Blue River could be reached five miles northeast or thirteen miles north if the turtles continued in a straight course. This would have been about two miles from where the Little Blue flows into the Missouri River. Lake Tapawingo, a much larger body of water than the Blue Springs Lake, could have been reached, one and three-fourths miles to the west.

Turtles are seldom sold in the markets locally but this species is sometimes hunted for table use.

***Terrapene ornata* (Agassiz).** Painted Box Turtle.

Box turtles are moderately common in the county, but they are now found less frequently than about ten years ago. An extensive highway building program has improved much of the 1300 miles of highway in the county and the increase in speed due to better roads has undoubtedly taken its toll of turtles. Numerous dead box turtles could be observed through the spring and summer at the time one stretch of concrete slab was laid, but fewer specimens are seen each year.

Specimens have been taken throughout the county. Some are occasionally found in town, but probably most of these are individuals that were brought into town and liberated.

This species mated freely in May but copulation, or attempted copulation, was noted at various times throughout the spring and summer. Occasionally a male would attempt to mate with another male. Egg laying was observed, always in the evening, at various dates in the latter half of June.

Box turtles kept in an outdoor enclosure would start digging on the first cool nights, usually in October. Those dug up in March were found to have gone about two feet below the surface. The others emerged early in May.

One small individual had but three toes on one hind foot. Another caught near Independence has five left costal shields and the fourth

vertebral is irregularly divided into three pieces. This turtle has been in the writer's possession for twelve years. A third has seven irregularly shaped shields in the position usually occupied by the third, fourth, and fifth vertebrae. This individual had an old injury to the carapace, nearly a half inch deep, an inch and a quarter long, and three quarters of an inch wide.

***Terrapene carolina triunguis* (Agassiz).** Three-toed Box Turtle.

This turtle has been encountered only a few times locally. Occasional specimens are found in the Independence city limits but it is known that some of these were brought back from the Ozark region, where they are very common.

***Chrysemys picta bellii* (Gray).** Western Painted Turtle.

Western painted turtles have been taken in the Little Blue River near Little Blue and Lake City. They were also caught in Fry's Lake near Little Blue and in water-filled ditches near Lake City. A juvenile found in July, 1936, at Little Blue, evidently of the previous year's hatch, measured 43 x 40 mm.

Turtles of this species have been seen in Fairmount Lake at Fairmount. A female was found wandering through the Refinery at Sugar Creek, on July 6, 1936. Captive specimens feed on both vegetable and animal matter.

***Pseudemys troostii elegans* (Wied).** Cumberland Turtle.

This turtle is not often found locally. One or two have been seen in the Little Blue River and a large, melanistic male that had been killed by a car was seen July 11, 1935, on a road near the Little Blue. Numerous juveniles have been seen in the Lake of the Woods in Swope Park, but many baby specimens purchased at pet stores are liberated in this lake when the owners tire of caring for them. In captivity they feed on lettuce, apples, insects, crayfish, raw meat, and fish.

***Amyda mutica* (Le Sueur).** Soft-shelled Turtle.

A soft-shelled turtle of this species that had been killed by a fisherman was observed June 6, 1936, at Fry's Lake.

***Amyda spinifera spinifera* (Le Sueur).** Spiny Soft-shelled Turtle.

Two specimens caught in nets in the Missouri River near Atherton are at present alive in the writer's collection. They feed on raw meat, fish and insects.

LITERATURE CITED

Blanchard, Frank N.

- 1925 A collection of amphibians and reptiles from southeastern Missouri and southern Illinois. Papers Mich. Acad. Sci., Arts and Let., vol. 4, 1924, p. 533-541.

Boyer, Dorothy A. and Albert A. Heinze

- 1934 An annotated list of the amphibians and reptiles of Jefferson County, Missouri. Trans. Acad. Sci. St. Louis, vol. 28, no. 4, p. 185-200, fig. 1, 2.

Gloyd, Howard K.

- 1934 Studies on the breeding habits and young of the copperhead, *Agkistrodon mokasen* Beauvois. Papers Mich. Acad. Sci. Arts, and Let., vol. 19, 1933, p. 587-604, fig. 18, 19, pl. 77-79.

Hoy, P. R.

- 1865 . Journal of an exploration of western Missouri in 1854, under the auspices of the Smithsonian Institution. Ann. Rep. Smithsonian Inst., 1864, p. 431-438.

Hurter, Julius

- 1911 Herpetology of Missouri. Trans. Acad. Sci. St. Louis, vol. 20, no. 5, p. 59-274, pl. 18-24.

Taylor, Edward H.

- 1936 A taxonomic study of the cosmopolitan scincoid lizards of the genus *Eumeces* with an account of the distribution and relationships of its species. Kansas Univ. Sci. Bull., vol. 23, p. 1-643, fig. 1-84, pl. 1-43.